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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,220	07/01/2003	Thomas Bradley Beddard	839-1470	1219
30024	7590	06/09/2005	EXAMINER	
NIXON & VANDERHYE P.C. 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203			KERNS, KEVIN P	
			ART UNIT	PAPER NUMBER
			1725	

DATE MAILED: 06/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No.	Applicant(s)	
	10/604,220	BEDDARD ET AL.	
	Examiner	Art Unit	
	Kevin P. Kerns	1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2005 and 02 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 5-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 5-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Specification

1. The amendment filed April 13, 2005 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: "extending from a lower end of said core upwardly more than half a height dimension of the core, into said upper body portion". Although Figures 1-4 of this application appear similar to this limitation, the applicants are referred to MPEP 2125 that states, "Proportions of features in a drawing are not evidence of actual proportions when drawings are not to scale". Furthermore, the applicants have not set forth the criticality of this new matter limitation in the originally filed specification. Applicants are required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1, 2, and 5-9 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to

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one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

With regard to independent claims 1 and 7, the new limitation "extending from a lower end of said core upwardly more than half a height dimension of the core, into said upper body portion" lacks support in the originally filed specification, and is considered to be new matter. Although Figures 1-4 of this application appear similar to this limitation, the applicants are referred to MPEP 2125 that states, "Proportions of features in a drawing are not evidence of actual proportions when drawings are not to scale". Furthermore, the applicants have not set forth the criticality of this new matter limitation in the originally filed specification. Why is the "more than half height" dimension of the core critical?

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

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not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1, 2, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Obrochta et al. (US 4,283,835) in view of the applicants' admitted prior art (paragraph [0002] of applicants' specification). [NOTE: NEW MATTER NOT CONSIDERED]

Obrochta et al. disclose a cambered core positioning system for use in casting of gas turbine airfoils, in which the cambered ceramic core 20 includes a solid curved upper body portion; a pair of substantially planar legs extending downwardly from the upper body portion, with the upper body portion being curved to form opposite concave 26' and convex 26 surfaces, and the pair of legs being separated by an elongated slot 37; and a plurality (arranged in pairs) of laterally aligned pegs (fixed pins 28,30,32 cooperating with respective spring-loaded movable peripheral pins 28',30',32', as well as cooperating movable centerline pins 34,34',36,36') projecting axially from opposite sides of the convex surface 26 of the upper body portion above and closer to the elongated slot 37, but spaced from an upper edge of the upper body portion (abstract; column 2, lines 55-68; column 3, lines 1-26; column 4, line 9 through column 7, line 54; and Figures 1-3). Obrochta et al. do not disclose that the pair of legs is co-planar.

However, the applicants' admitted prior art discloses a stage 1 gas turbine bucket that includes a (co-planar) "pants-leg" shaped core operable to form a pair of cooling

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passages to improve the cooling scheme of the turbine bucket (see paragraph [0002] of applicants' specification).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the design of the pair of legs of the cambered core used for casting gas turbine airfoils, as disclosed by Obrochta et al., by using a coplanar "pants-leg" shaped core, as taught by the applicants' admitted prior art, in order to form a pair of cooling passages to improve the cooling scheme of the turbine bucket (paragraph [0002] of applicants' specification).

7. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Obrochta et al. (US 4,283,835) in view of the applicants' admitted prior art (paragraph [0002] of applicants' specification) as applied to claims 1 and 2 above, and further in view of either Willett et al. (EP 1 022 434 A2) or Lee (US 6,234,753). [NOTE: NEW MATTER NOT CONSIDERED]

Obrochta et al. (in view of the applicants' admitted prior art) disclose and/or suggest the elements of claims 1, 2, 5, and 6 above. Neither Obrochta et al. nor the applicants' admitted prior art specifically discloses pegs of elliptical cross section.

However, Willett et al. disclose a gas turbine blade cooling configuration for gas turbine buckets, in which the cooling configuration is provided by one or more elliptically-shaped radial cooling passages 54 formed by utilizing elliptically-shaped quartz rods (pegs) within the ceramic core, such that the use of elliptically-shaped quartz rods (pegs) provides the advantages of creating coolant cross flow between

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adjacent radial passages while minimizing stress concentration in the bucket (abstract; paragraphs [0005]-[0010]; and Figures 1-3).

In addition, Lee discloses a turbine airfoil with internal cooling, in which the internal cooling is provided by a plurality of core tie holes (42,142) that are preferably elliptical in cross-section, such that the core tie holes (42,142) would necessarily be created by using core supports in the form of elliptical pegs/rods, with the elliptical core tie holes providing the advantages of controlling coolant cross flow between adjacent radial passages (via minimizing pressure differential) while minimizing stress in the turbine airfoil (abstract; column 2, lines 10-17 and 40-67; column 3, line 1 through column 5, line 53; and Figures 1 and 2).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the cambered ceramic core disclosed by Obrochta et al., by using a co-planar "pants-leg" shaped core, as taught by the applicants' admitted prior art, in order to form a pair of cooling passages to improve the cooling scheme of the turbine bucket, and by further using pegs/pins with elliptical shapes, as taught/suggested individually by Willett et al. and Lee, in order to create coolant cross flow between adjacent radial passages while minimizing stress concentration in the bucket (Willett et al.; paragraphs [0005] and [0010]), and in order to control coolant cross flow between adjacent radial passages (via minimizing pressure differential) while minimizing stress in the turbine airfoil (Lee; column 3, lines 29-31 and 62-67; column 4, lines 1-5 and 25-67; and column 5, lines 1-53).

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8. Claims 1, 2, and 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Obrochta et al. (US 4,283,835) in view of the applicants' admitted prior art (paragraph [0002] of applicants' specification), and further in view of either Willett et al. (EP 1 022 434 A2) or Lee (US 6,234,753). [NOTE: NEW MATTER IS BEING CONSIDERED]

Obrochta et al. (in view of the applicants' admitted prior art) disclose and/or suggest the elements in paragraph 6. Neither Obrochta et al. nor the applicants' admitted prior art specifically discloses pegs of elliptical cross section, as well as a core having an elongated open slot extending from a lower end of the core upwardly more than half a height dimension of the core.

However, Willett et al. disclose a gas turbine blade cooling configuration for gas turbine buckets, in which the cooling configuration is provided by one or more elliptically-shaped radial cooling passages 54 formed by utilizing elliptically-shaped quartz rods (pegs) within the ceramic core, such that the use of elliptically-shaped quartz rods (pegs) provides the advantages of creating coolant cross flow between adjacent radial passages while minimizing stress concentration in the bucket (abstract; paragraphs [0005]-[0010]; and Figures 1-3). Furthermore, Figure 1 shows a gas turbine blade cooling configuration having an array of cooling circuit dividing channels that must be manufactured by one or more cores having an elongated open slot extending from a lower end of the core upwardly more than half a height dimension of the core, such that such a core creates longer divided cooling channels that would result in improved cooling of the turbine blade, as one of ordinary skill in the art would have recognized.

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In addition, Lee discloses a turbine airfoil with internal cooling, in which the internal cooling is provided by a plurality of core tie holes (42,142) that are preferably elliptical in cross-section, such that the core tie holes (42,142) would necessarily be created by using core supports in the form of elliptical pegs/rods, with the elliptical core tie holes providing the advantages of controlling coolant cross flow between adjacent radial passages (via minimizing pressure differential) while minimizing stress in the turbine airfoil (abstract; column 2, lines 10-17 and 40-67; column 3, line 1 through column 5, line 53; and Figures 1 and 2). Furthermore, Figures 1 and 2 show a turbine airfoil having an array of cooling circuit dividing channels that must be manufactured by one or more cores having an elongated open slot extending from a lower end of the core upwardly more than half a height dimension of the core, such that such a core creates longer divided cooling channels that would result in improved cooling of the turbine airfoil, as one of ordinary skill in the art would have recognized.

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the cambered ceramic core disclosed by Obrochta et al., by using a co-planar "pants-leg" shaped core, as taught by the applicants' admitted prior art, in order to form a pair of cooling passages to improve the cooling scheme of the turbine bucket, and by further using pegs/pins with elliptical shapes, and a core having an elongated open slot extending from a lower end of the core upwardly more than half a height dimension of the core, as taught/suggested individually by Willett et al. and Lee, in order to create coolant cross flow between adjacent radial passages while minimizing stress concentration in the bucket (Willett et

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al.; paragraphs [0005] and [0010]), and in order to control coolant cross flow between adjacent radial passages (via minimizing pressure differential) while minimizing stress in the turbine airfoil (Lee; column 3, lines 29-31 and 62-67; column 4, lines 1-5 and 25-67; and column 5, lines 1-53). Furthermore, both Willett et al. and Lee disclose and/or suggest that the array of cooling circuit dividing channels made by one or more cores, as one of ordinary skill in the art would have recognized, are advantageous for creating longer divided cooling channels that would result in improved cooling of the turbine blade and airfoil, respectively.

Response to Arguments

9. The examiner acknowledges the applicants' amendment and the request for continued examination, which were received by the USPTO on April 13, 2005 and May 2, 2005, respectively. The applicants' amendments to the specification and independent claims 1 and 7 introduce new matter objections to the specification, as well as 35 USC 112, 1st paragraph rejections to the claims (see paragraphs 1-3). It is noted that the 35 USC 103(a) rejections in paragraphs 6 and 7 are treated without consideration to the new matter in claims 1 and 7. However, (new) paragraph 8 sets forth 35 USC 103(a) rejections with the new matter limitations being considered. The applicants have cancelled claims 3 and 4. Claims 1, 2, and 5-9 are currently under consideration in the application.

10. Applicants' arguments filed April 13, 2005 have been fully considered but they are not persuasive.

With regard to the applicants' arguments that address the Obrochta et al. reference on pages 5-7 of the remarks/arguments, the examiner continues to agree with the applicants that the pair of legs disclosed in Obrochta et al. are not co-planar, but this limitation had previously prompted the grounds of rejection that include the applicants' admitted prior art. However, the examiner continues to respectfully disagree with the applicants' assertion that Obrochta et al. do not teach a "solid, curved upper body portion". The applicants continue to state that there are "two planar portions intersecting at a curved portion along the entire length of the core". The "curved portion" indeed exists in the upper body portion, and thus does not further limit claims 1 and 7 with respect to the 35 USC 103(a) rejections based on the combination(s) of Obrochta et al., the applicants' admitted prior art, Willett et al., and Lee in above paragraphs 6-8. The examiner also respectfully disagrees with the applicants' assertion that the limitation "open slot" overcomes the Obrochta et al. disclosure of groove 37. A groove is essentially a slot, and the term "open" does not narrow this term, as both a groove and a slot inherently define "open" space.

In response to applicants' argument (on page 6 of the remarks/arguments) that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed

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invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kevin P. Kerns whose telephone number is (571) 272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin P. Kerns *Kevin Kerns 6/4/05*
Primary Examiner
Art Unit 1725

KPK
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June 4, 2005